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10/650,605	08/28/2003	Edmund O. Schweitzer III	1444-0003	8310

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EXAMINER	
HOANG, ANN THI	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/650,605	SCHWEITZER ET AL.	
	Examiner	Art Unit	
	Ann T. Hoang	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5 and 7-9* is/are rejected.

7)☒ Claim(s) *3 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The replacement sheet of Figs. 1 and 2 was received on 31 January 2006. The addition of designators 22, 25, 26, 27 and 29 overcome the previous objection to Fig. 2.

2. New formal drawings for Figs. 1 and 2 in compliance with 37 CFR 1.121(d) are required in this application because the current replacement sheet for Figs. 1 and 2 contains handwritten markups and therefore appears to be in a rough and informal format. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: On page 2, line 38, it appears that the first author has been misnamed and "S.E." should be changed to --S.A.--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griesemer et al. (US 2003/0146725) in view of Davis (US 4,806,855).

Regarding claim 1, Griesemer et al. discloses a protective relay system 10 using programmable logic present within the relay with the capability of constructing associated logic equations, comprising: a protective relay, which includes a programmable logic capability by which the end user of the protective relay can enter settings which are then used by the relay in carrying out its thermal protection functions; a set of stored thermal model equations which when solved emulate the temperature of a motor, based on a plurality of individual setting values which are enterable into the relay by the end user, and wherein the logic and logic equations implement the entered setting values into the thermal model equations which produce an emulated temperature of the motor; and means for providing an indication 56 when the temperature of the motor exceeds a preselected value. The settings entered by the end user include a full load amperage (FLA) adjustment and a current sense input, among others, which are some of the factors determining the outcome of the thermal model (see page 1, paragraphs 6 and 8). Page 3, paragraph 32 shows the main equation for constructing the thermal model, and it can be seen in Fig. 2B that the calculation of the thermal model involves a plurality of equations and iterations. Also see abstract; Fig. 1; pages 1-2, paragraph 17; page 4, paragraph 34; and claim 28. The protective relay

system of Griesemer et al. is applied to thermal protection for motor coils and not power lines.

However, Davis discloses a system for rating power lines that models the thermal characteristics of a power line based on a set of stored thermal equations (Equations 1-5). See abstract and column 5, lines 1-8, in which an assumed conductor temperature-time model is disclosed. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a protective relay system with programmable input settings, such as that of Griesemer et al., in the application of modeling the thermal characteristics of a power line, such as that of Davis, in order to accurately calculate the temperature of the power line, based on user input data, and trip the power line relay upon overheating in order to protect it.

Regarding claim 2, Davis discloses the thermal model of the power line to be dependent on solar model values directed toward heating of the conductor affected by solar considerations, thermal model values which are determined from physical aspects of the conductor, and temperature values. It is disclosed in column 7, lines 19-23 that the thermal state of the power line conductor is defined by the ambient temperature, conductor temperature, solar radiation and line current. See columns 7-8 for formula variables and descriptions. It would have been obvious to one of ordinary skill in the art at the time of the invention to make these variables the settings entered by the end user in order to model the thermal characteristics of the power line and calculate the assumed conductor temperature-time model based on these formulas.

Regarding claim 4, Griesemer et al. discloses the steps of checking the temperature of the motor coil represented by a thermal pile and providing an alarm but a do-not-trip mode upon the logic output exceeding a first threshold, and providing a trip signal for a circuit breaker upon the logic output exceeding a second threshold. See steps (236, 248, 252, 258) in Fig. 2C; page 4, paragraph 39, lines 24-39; and claims 28 and 36. The comparisons of the logic output to the first and second thresholds would necessarily involve a first and second comparator embedded in the computing circuitry. It would have been obvious to one of ordinary skill in the art at the time of the invention to perform this comparison method in the power line protective relay system in order to alert the user without tripping the relay during a case in which the system or process of applying power through the power line was more critical than the power line itself, and in order to trip the relay during a case in which continuing to apply power was not worth the expense of overheating the power line.

Regarding claim 5, Griesemer et al. discloses the calculation of a first order differential equation to model the real-time temperature of the motor coil (see page 1, paragraph 7). It appears that the settings entered by the user in the protective relay system for power line thermal protection of claim 1 would yield a model of the conductor temperature expressed as a first order differential equation in accordance with $P-L=THC\frac{dTC}{dt}$, where P is equal to the heat power supplied to the conductor, L is the conductor heat losses, THC is the conductor heat thermal capacity and TC is the estimated conductor temperature.

Regarding claim 7, power lines, such as those disclosed by Davis, conduct over long distances and would necessarily require a distance relay, as opposed to a conventional relay used for smaller circuit applications, in a protective relay system.

Regarding method claim 8, the recited method steps would necessarily be performed in the usage of the above mentioned protective relay system for power line thermal protection. See above rejection on claim 1.

Regarding claim 9, all the limitations of claim 9 are recited in claim 1, therefore claim 9 is rejected on the same grounds as that of claim 1. See above rejection on claim 1.

Allowable Subject Matter

6. Claims 3 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and edited according to the claim objection above. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, Davis discloses solar, thermal and temperature model values upon which a thermal model for a power line depends, including a solar absorption coefficient, the conductor diameter, the line resistance as a function of temperature, and the estimated ambient temperature. The prior art fails to teach the default solar heating value, the longitude of time standard, the longitude and latitude of the conductor, the temperature coefficient of the AC resistance, the thermal heating capacity, the thermal

resistance to the ambient temperature, the estimated offset temperature, the high and low temperature thresholds, and the conductor initial temperature as being variables in a thermal model for a power line.

Regarding claim 6, the prior art fails to teach the heat power supplied to a power conductor to be $=(I^2 \bullet (rac)+(TC-25) \bullet rdelt)+Q_{sun}$.

Response to Arguments

7. Applicant's arguments filed 31 January 2006 have been fully considered but they are not persuasive.

In response to applicant's argument that Griesemer et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Griesemer et al. is reasonably pertinent to the particular task with which the applicant is concerned , which is the task of calculating the projected temperature of a system under protection based on user inputs and stored thermal model equations and implementing protective measures upon an overtemperature, the protective measures specifically including activating an alarm and/or tripping a circuit breaker or protective relay. Although Griesemer et al. applies the protective relay system to a motor overload coil and not to power lines, one of ordinary skill in the art of power lines would recognize that the system of Griesemer et al. could be applied to

many types of applications that necessitate activating and alarm and/or opening a protective relay to cut off power to a device suffering an overtemperature. Furthermore, the concept of activating and alarm and/or opening a protective relay based on a calculated temperature and not an actual measured temperature could be exercised in many fields other than that of power lines and motors, as complex electrical and mechanical systems often experience temperature dependency on a plurality of factors ranging from operating characteristics to deliberate user settings.

In response to applicant's argument that there is no source for a motivation to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Davis discloses that, in the art of power line protection, there is generally a desire to shut down power lines suffering overload and overtemperature (column 5, lines 11-22). Since Davis discloses this desire and provides a thermal model, and Griesemer et al. provides a protective relay that opens based on the output of a thermal model, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the concept of a protective relay system driven by a thermal model of Griesemer et al. with the thermal model in a power line setting of Davis in order provide thermal protection for power lines.

In response to applicant's argument that the inputs disclosed by Griesemer et al. are not enterable by an end user as required by claim 1, Griesemer et al. discloses in claims 15 and 18 that the FLA setting is user adjustable. In view of this, the potentiometer (28) in Fig. 4D used for FLA adjustment must be meant for a user to adjust.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann T. Hoang, whose telephone number is 571-272-2724. The examiner can normally be reached Mondays through Fridays, 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached at 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ATH
13 April 2006

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